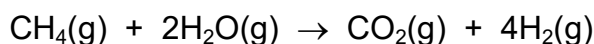


3 What contains 9.03×10^{23} oxygen atoms?

- A** 0.25 mol aluminium oxide
- B** 0.75 mol sulfur dioxide
- C** 1.5 mol sulfur trioxide
- D** 3.0 mol water

4 Methane and steam react to produce hydrogen.

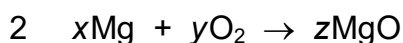
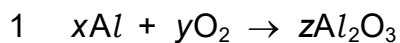


0.80 g of methane and 1.35 g of steam react. One of the reactants is used up.

Which volume of hydrogen, measured at room conditions, will be produced?

- A** 1.80 dm³ **B** 3.60 dm³ **C** 4.80 dm³ **D** 7.20 dm³

17 Three equations are listed. x , y and z are all whole numbers.



Which equations can be balanced if $x = 4$ and $z = 2$?

- A** 1 and 3 **B** 1 only **C** 2 only **D** 3 only

40 A sample of magnesium contains the isotopes ^{24}Mg , ^{25}Mg and ^{26}Mg only.

The percentage abundance of ^{25}Mg and ^{26}Mg is the same.

The relative atomic mass of magnesium in the sample is 24.3.

What is the percentage abundance of ^{24}Mg ?

- A** 10% **B** 20% **C** 60% **D** 80%

Important values, constants and standards

molar gas constant	$R = 8.31 \text{ J K}^{-1} \text{ mol}^{-1}$
Faraday constant	$F = 9.65 \times 10^4 \text{ C mol}^{-1}$
Avogadro constant	$L = 6.02 \times 10^{23} \text{ mol}^{-1}$
electronic charge	$e = -1.60 \times 10^{-19} \text{ C}$
molar volume of gas	$V_m = 22.4 \text{ dm}^3 \text{ mol}^{-1}$ at s.t.p. (101 kPa and 273 K) $V_m = 24.0 \text{ dm}^3 \text{ mol}^{-1}$ at room conditions
ionic product of water	$K_w = 1.00 \times 10^{-14} \text{ mol}^2 \text{ dm}^{-6}$ (at 298 K (25 °C))
specific heat capacity of water	$c = 4.18 \text{ kJ kg}^{-1} \text{ K}^{-1}$ (4.18 J g ⁻¹ K ⁻¹)

- 4 A solution containing 4.4 g of an organic acid is exactly neutralised by 25.0 cm³ of 2.0 mol dm⁻³ sodium hydroxide. The acid has one COOH group in each molecule.

What is the empirical formula of the acid?

- A** CH₂O **B** C₂H₄O **C** C₃H₆O₃ **D** C₄H₈O₂

- 40 A sample of gallium contains two isotopes only.

In every 10 atoms in the sample, there are 6 that have 38 neutrons and 4 that have 40 neutrons.

What is the relative atomic mass, A_r , of the gallium in the sample?

- A** 69.7 **B** 69.8 **C** 70.0 **D** 70.2

Important values, constants and standards

molar gas constant	$R = 8.31 \text{ J K}^{-1} \text{ mol}^{-1}$
Faraday constant	$F = 9.65 \times 10^4 \text{ C mol}^{-1}$
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